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(21) International Application Number: PCT/GB00/01207 (22) International Filing Date: 6 April 2000 (06.04.00) (30) Priority Data: 9907556.6 6 April 1999 (06.04.99) GB (71) Applicant (for all designated States except US): EWOS LIMITED [GB/GB]; Ewos Technology Centre, Unit 1, Kingsthorpe Park, Houston Industrial Estate, Livingston EH54 5DB (GB). (72) Inventors; and (75) Inventors/Applicants (for US only): SOLBAKKEN, Roar [NO/NO]; Holmsensv 28, N-2010 Strammen (NO). SLINNING, Karl-Erik [NO/NO]; Sønnaveien 13, N-1476 Rasta (NO). NILSSON, Astrid [NO/NO]; Parkveien 8, N-1430 As (NO). VOGT, Gjermund [NO/NO]; Seterhøyveien 12, N-1176 Oslo (NO). THOMASSEN, Magny, Skinlo [NO/NO]; Grefgenkollvn 12B/285, N-0490 Oslo (NO). RØRÅ, Anna, Marie, Bencze [NO/NO]; "Villa Granholt", N-1555 Son (NO). (74) Agent: MURGITROYD & COMPANY; 373 Scotland Street, Glasgow G5 8QA (GB).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published With international search report.
(54) Title: FLAVOURING		
(57) Abstract <p>The present invention relates to a method of altering the flavour of farmed fish meat. Specifically, the invention provides a fish food, which is produced by a novel method wherein incorporation of a flavouring is incorporated into the feed along with the standard feed components. When this feed is subsequently fed to the fish, it results in an alteration of the flavour of the fish. In particular the present invention discloses the use of caraway oil, rosemary, lemon oil and garlic oil are especially effective at influencing the flavour of fish, once they have been added to the feed.</p>		

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1 FLAVOURING

2

3 This invention relates to a method of altering the
4 flavour of fish meat. Specifically the process relates
5 to the improvement of fish flavour through the addition
6 of flavourings to the feed composition. This method
7 allows the flavour of farmed fish such as salmon,
8 rainbow trout, brown trout and the like to be tailored
9 for different consumer markets which in turn can lead
10 to an increase in consumer choice through the
11 incorporation of different flavours.

12

13 The alteration of the flavour in the fish meat is
14 brought about through the addition of different
15 ingredients to the feed, which when taken up during the
16 digestive processes, leads to them becoming
17 incorporated in the fish meat with a resultant change
18 in fish flavour.

19

20 European Patent Application No 635217A sets out a
21 method for modifying the characteristics of meat and
22 fat to be obtained from livestock and poultry

1 comprising feeding the livestock and poultry with
2 spices. The active ingredients of the spice are taken
3 into the body and transferred to internal fat thereby
4 modifying the characteristics of the meat and improving
5 the smell of the fat. Further, European Patent
6 Application No 303764A provided a process for improving
7 the flavour of hens' eggs through feeding hens a mixed
8 feed containing essential oils.

9
10 Japanese Patent Application No 2207758A incorporated
11 crude plant essential oils into feed composition for
12 fish culture to prevent infectious disease of fish and
13 inhibition of proliferation of pathogenic micro-
14 organisms. Also, Japanese Patent Application No
15 10229830A relates to the incorporation of spices into
16 fish feed to prevent a reduction in the flavour and
17 taste of fish meat due to the deterioration of
18 freshness over a short period of time and suppression
19 of colour variation of dark coloured fish.

20
21 None of the previous Patent disclosures provide a
22 method of altering the flavour of fish through the
23 manipulation and alteration of feed ingredients.

24
25 It is an object of the present invention to provide a
26 method of altering the flavour of fish by use of
27 flavouring compounds.

28
29 A further object of the present invention is to provide
30 fish feed which results in an alteration of the flavour
31 of the fish.

32

1 According to the present invention there is provided a
2 method of manufacturing fish feed to alter the flavour
3 of fish, the method comprising mixing feed components
4 and adding a flavouring, characterised in that feeding
5 of the fish feed to fish results in an alteration of
6 the flavour of the fish.

7

8 Preferably the flavouring ingredient is selected from
9 the group consisting of; dibromophenol, smoke aroma,
10 mussel extract, horseradish powder, juniper berry,
11 olive, blackcurrant, walnut or the like.

12

13 More preferably the flavouring ingredient will be
14 selected from the group comprising; caraway oil, lemon
15 oil, rosemary, garlic powder, lemon and garlic
16 combination or the like.

17

18 Further, a method of altering the flavour of fish is
19 provided, comprising the steps of modifying a fish feed
20 by means of the incorporation of a desired flavouring
21 agent into a fish feed and feeding said fish with the
22 feed.

23

24 Preferably the fish are fed with said modified feed for
25 a period of at least two weeks.

26

27 Alternatively, the fish are fed with said modified feed
28 for a period of at least one month.

29

30 Preferably the flavouring ingredient is selected from
31 the group consisting of; dibromophenol, smoke aroma,

1 mussel extract, horseradish powder, juniper berry,
2 olive, blackcurrant, walnut or the like.

3

4 Preferably the flavouring ingredients will be added to
5 the fish feed individually.

6

7 There is further provided a fish feed for use in
8 flavouring fish, the feed comprising feed components
9 and a flavouring which results in an alteration of the
10 flavour of the fish.

11

12 Preferably, the fish feed contains a flavouring wherein
13 this flavouring ingredient is selected from the group
14 comprising; dibromophenol, smoke aroma, mussel extract,
15 horseradish powder and juniper berry, olive,
16 blackcurrant, walnut or the like.

17

18 More preferably the flavouring ingredient will be
19 selected from the group comprising; caraway oil, lemon
20 oil, rosemary, garlic powder, lemon and garlic
21 combination or the like.

22

23 When the flavouring ingredient is lemon oil, an
24 apparent improvement in fish texture is observed. This
25 may also be achieved with other flavouring ingredients.

26

27 From the tests described and results set out herein it
28 is clear that a change in fish meat flavour can be
29 brought about through alteration of the ingredients of
30 the feed. It is of special significance and interest
31 that the feeding of fish for a time period of less than
32 one month can result in a significant effect on the

1 significant effect on the fish meat flavour. It should
2 also be noted that there seems to be an apparent
3 improvement in the texture of the fish meat, this being
4 exemplified by the fish examined in the first trial
5 wherein lemon oil was added to the feed.

6

7 Generally, fish feeds are composed of two main
8 components; a meal component and an oil component.

9

10 A thorough investigation was carried out into the
11 addition of ingredients to the food, such that an
12 alteration of fish flavour could be achieved. These
13 investigations are detailed in the trials shown below.

14

15 The results obtained from the experimentation are
16 further detailed in the figures wherein;

17

18 Figure 1 shows a graphical plot of all diets in
19 respect of all 18 of the attributes tested on
20 samples in Trial 1,

21

22 Figure 2 shows a two dimensional scatter plot
23 showing the principal component analysis (PCA) on
24 fish from Trial 1 which have been fed seven diets,

25

26 Figure 3 shows a two dimensional scatter plot
27 showing principal component analysis (PCA) on
28 individual fish samples, and

29

30 Figure 4 shows a graph detailing the chemical
31 analysis showing volatiles from fish which have
32 been fed with different flavouring ingredients.

1 Trial 1

2

3 This trial studied the incorporation of flavour
4 ingredients into fish feed to manipulate the taste of
5 the fish. Detailed sensory and technical analysis was
6 carried out in this experiment to look at volatile
7 compounds, as the sensory properties of fish flavour
8 are mostly based on volatile components in different
9 concentrations.

10

11 Chemical and sensory analysis were performed on fish
12 from the dietary groups.

13

14 Atlantic salmon (*Salmo salar*) were fed on one of the
15 following seven different diets comprising standard
16 fish feed with added flavouring compounds:

17

18 Diet 289: normal control diet

19 Diet 290: 0.005g 2,6-dibromophenol added to 1Kg feed

20 Diet 291: 0.5g caraway oil added to 1Kg feed

21 Diet 292: 1.0g lemon oil added to 1Kg feed

22 Diet 293: 0.5g smoke aroma added to 1Kg feed

23 Diet 294: 0.5g rosemary extract to 1Kg feed

24 Diet 295: 10.0g freeze-dried minced shellfish (*Mytilus*
25 *edulis*) added to 1Kg feed

26

27 The fish were fed for a period of eight weeks. At the
28 end of this period, the fish were slaughtered according
29 to standard procedure. The fish were gutted and iced 4
30 days before analysis.

31

1 Sensory Analysis

2 The sensory analysis was performed as a standard
3 flavour profile method (Qualitative-Descriptive-
4 Analysis, ISO 6564:1985) using 12 trained assessors.
5 Prior to the analysis, the sensory panel was calibrated
6 on the chosen attributes and the intensity of the
7 attributes.

8
9 The attributes chosen for the describing test for odour
10 were:

11 Salmon odour, acidic odour, sea odour, caraway odour,
12 rosemary odour, smoke odour and shellfish odour.

13
14 The attributes chosen for the describing test for
15 flavour were:

16 Salmon flavour, acidic flavour, sea flavour, caraway
17 flavour, rosemary flavour, smoke flavour, shellfish
18 flavour and bitter flavour.

19
20 Colour attributes were chosen as whiteness, hue and
21 intensity.

22
23 The fish was served as 15 millimetre thick cutlets, one
24 for each assessor. Each sample was vacuumed in plastic
25 bags before heat treatment in a water bath at 75°C for
26 30 minutes. The samples were served randomly according
27 to diet treatment, fish number and assessor. Each
28 assessor was always given the cutlet taken from the
29 same position of the fish fillet.

30
31 Each assessor evaluated the samples at individual speed
32 on a computerised system for direct recording of data

1 (Compusense, Canada) using a continuous scale, where
2 the left side of the scale indicated no intensity, and
3 the right side indicated high intensity. The computer
4 transformed the responses into numbers from 1.0 (no
5 intensity) to 10 (high intensity).
6

7 Chemical analysis

8 Volatile compounds. This evaluation was carried out on
9 the basis that sensory properties of fish flavour are
10 mostly based on volatile components in different
11 concentrations and as such this part of the experiment
12 served to identify these.
13

14 Homogenised fish (25g) from the same batch that the
15 sensory panel tested were mixed with 100ml of distilled
16 water in a sealed erlenmeyer and heated to 70°C for 10
17 minutes before 100ml/min nitrogen was flushed through
18 the slurry for 20 minutes. Volatile compounds were
19 absorbed on Tenax GR. Absorbed volatiles were injected
20 by a Perkin Elmer ATD-400, into a HP5890-HP5970 GC-MSD
21 system. Unknown volatiles were identified by means of
22 a Wiley MS library search.
23

24 Sensory Analysis

25 No differences in colour attributes were observed.
26 Fish from diet group 294 (rosemary), were significantly
27 different on 11 attributes from fish given other diets.
28 Further, fish from this group also had a higher
29 intensity of rosemary odour and flavour and were more
30 bitter than fish given diets 289, 290, 291, 293 and
31 295.
32

9

1 Fish from diet group 294 had a lower level of salmon
2 odour, acidic acid odour, sea odour, salmon flavour,
3 acidic flavour and a higher level of rosemary odour and
4 flavour.

5

6 Fish from diet group 293 (smoke), were more intense in
7 salmon flavour than 292, and less intense in bitter
8 flavour than 292.

9

10 The PCA scatter plots shown in Figures 2 and 3 can be
11 used in interpret the results and explain 100% of the
12 variation.

13

14 Figure 2 separates the samples mainly by odour and
15 flavour of rosemary in comparison with odour and
16 flavour of salmon, sea and acidic. This explains 97%
17 of the variation. Diet 294 is described as the single
18 diet with rosemary flavour/odour. Figure 2 (explaining
19 the other 3% of the variation) is described by caraway
20 and bitter flavour. Fish feed with diet 292 and diet
21 291 are found in that part of the plot. Fish fed with
22 diets 295, 293, 290 and 289 are grouped very near each
23 other.

24

25 Table 1 shows the analysis of Tukey's test on fish fed
26 7 diets.

27

28 The fish fed the different diets were significantly
29 different ($P < 0.05$) for 12 of the 18 analysed
30 attributes: salmon odour, acidic odour, sea odour,
31 rosemary odour, shellfish odour, salmon flavour, acidic

10

1 flavour, sea flavour, caraway flavour, rosemary
2 flavour, shellfish flavour and bitter flavour.

3

4 Fish number 305 from Diet 294 may be an outlier. An
5 outlier is an object that is so different statistically
6 from the other objects in the same class, that there is
7 a possibility that the object does not belong to that
8 class. It is proposed that the fish which is an
9 outlier has been exchanged during handling or
10 packaging. Statistical analysis was performed with and
11 without this fish.

12

13 Fish fed with diet 294 had less salmon odour, acidic
14 odour, sea odour, salmon flavour, acidic flavour and
15 more rosemary odour and flavour, bitter flavour than
16 fish fed with other diets. There were also more
17 differences between diet groups for rosemary odour and
18 flavour.

19

20 Figure 1 shows a graphical plot of all diets for all
21 attributes (sample 305 included). The plot gives a
22 visual picture of the results.

23

24 Figure 2 shows a two dimensional scatter plot showing
25 Principal Component Analysis (PCA) on fish fed with the
26 7 diets (sample 305 included).

27

28 Figure 3 is a two dimensional scatter plot showing
29 Principal Component Analysis (PCA) on individual Fish
30 Samples (sample 305 included).

31

11

1 The differences between individual samples of fish in
2 each diet group are shown in this plot. As previously
3 mentioned, fish number 305 in diet group 294 differs
4 considerably from the others in that diet.

5

6 Dynamic analysis showed significant differences on
7 rosemary, lemon and caraway flavourings. These were
8 significantly different from each other and from the
9 other four flavours. These results are tabulated in
10 Table 2 and shown graphically in Figure 4. In
11 particular, the graphical representation of these
12 results shows clearly the difference in intensity of
13 the lemon, caraway and rosemary flavourings. The main
14 components found are based on terpenoid structures.
15 These molecules have a hydrophobic structure.

16

17 An improvement in texture of fish with flavourings was
18 also observed, particularly with lemon oil.

19

20 Trial 2

21

22 This further trial was based on results from Trial 1
23 and further analysed the ingredients which had shown
24 some of the most effective results from Trial 1. In
25 addition to these some new ingredients were also
26 investigated, these being:

27

28 Garlic powder, horseradish powder and juniper berry.

29

30 These ingredients were added to the feed in two levels.

31

32 Analysis of the results by sensory evaluation and

12

1 characterisation revealed clear differences between the
2 fish groups depending on which flavouring ingredient
3 was added. It was determined that the effects on fish
4 flavour were mediated by all the flavourings added in
5 Trial 2, but that the addition of the garlic powder and
6 the lemon oil ingredients had the greatest effects on
7 overall flavour.

8
9 Additional evaluation and determination of
10 effectiveness was carried out by testing the fish
11 in raw, cooked and smoked conditions. It should be
12 noted that the flavour differences continued to be
13 detected in all three of the aforementioned
14 preparations. The flavour differences were also
15 maintained during storage on ice. The flavour which
16 resulted from the incorporation of the lemon oil
17 ingredient into the diet was the most preferable.

18

19 Trial 3

20

21 The third experiment was performed to study both the
22 effect of combining flavour ingredients and to see how
23 quickly the flavour was incorporated from the feed into
24 the flesh of the fish. Four flavour ingredients were
25 used: olive, blackcurrant, walnut and a combination of
26 lemon and garlic. Atlantic salmon were fed the diets
27 for periods of three and six weeks respectively. After
28 three weeks of feeding the sensory panel evaluated that
29 18 of 24 sensory attributes of the fish flesh were
30 significantly different. After six weeks 24 of the 28
31 sensory attributes were found to be different. The
32 most significant differences were found in the flesh of

13

1 the fish fed the diet where lemon and garlic were
2 combined.

3

4 Conclusion

5 It has been shown that it is possible to manipulate the
6 taste of fish by incorporating flavour compounds in the
7 fish feed. The trials have shown that the addition of
8 rosemary, caraway and lemon to feed resulted in good
9 incorporation of flavour into the fish .

10

11 Further, the results from Trials 2 and 3, indicate that
12 the incorporation of garlic powder into the fish feed
13 also has a significant effect on overall fish flavour,
14 and that a combination of flavour ingredients can also
15 result in an alteration of fish flavour.

16

17 Further, Trial 3 indicates that the incorporation of
18 flavour into the flesh from the diet can be done within
19 a short period of time.

1 CLAIMS

2

3 1. A method of manufacturing fish feed to alter
4 flavour of fish, the method comprising mixing feed
5 components and adding a flavouring, characterised
6 in that feeding of the fish feed to fish results
7 in an alteration of the flavour of the fish.

8

9 2. A method as claimed in claim 1 wherein the fish
10 feed also results in an alteration in the texture
11 of the fish.

12

13 3. A flavouring for use in the method of claim 1 or 2
14 wherein said flavouring ingredient is selected
15 from the group comprising: dibromophenol, smoke
16 aroma, mussel extract, horseradish powder and
17 juniper berry, olive, blackcurrant, nut or the
18 like.

19

20 4. A flavouring for use in the method of claim 1 or 2
21 wherein the flavouring ingredient is selected from
22 the group comprising: caraway oil, lemon oil,
23 rosemary and garlic powder, lemon and garlic
24 combination or the like.

25

26 5. A method of altering the flavour of fish
27 comprising the steps of modifying a fish feed by
28 means of the incorporation of a desired flavouring
29 agent into a fish feed and feeding said fish with
30 the feed.

31

15

- 1 6. A method as claimed in claim 5 which also alters
2 the texture of the fish.
3
- 4 7. The method of claim 6, wherein fish are fed with
5 said modified feed for a period of at least two
6 weeks.
7
- 8 8. The method of any of claims 5 to 7, wherein fish
9 are fed with said modified feed for a period of at
10 least one month.
11
- 12 9. A flavouring for use in the method of any of
13 claims 5 to 8 wherein said flavouring ingredient
14 is selected from the group comprising:
15 dibromophenol, smoke aroma, mussel extract,
16 horseradish powder and juniper berry, or the like.
17
- 18 10. The method of any of claims 5 to 8 wherein the
19 flavouring ingredient is be selected from the
20 group comprising: caraway oil, lemon oil, rosemary
21 and garlic powder, or the like.
22
- 23 11. The method of any of claims 5 to 10 wherein the
24 flavouring ingredients will be added to the fish
25 feed individually.
26
- 27 12. A fish feed for use in flavouring fish meat, the
28 feed comprising feed components and a flavouring
29 which results in an alteration of the flavour of
30 the fish.
31

16

- 1 13. A fish feed as claimed in claim 12 for use
2 altering the texture of fish.
- 3 14. A flavouring for use in the feed of claim 12
4 wherein said flavouring ingredient is selected
5 from the group comprising: dibromophenol, smoke
6 aroma, mussel extract, horseradish powder and
7 juniper berry, olive, blackcurrant, nut or the
8 like.
9

Figure 1: Graphical plot of all diets in respect of all 18 of the attributes tested on samples in Trial 1

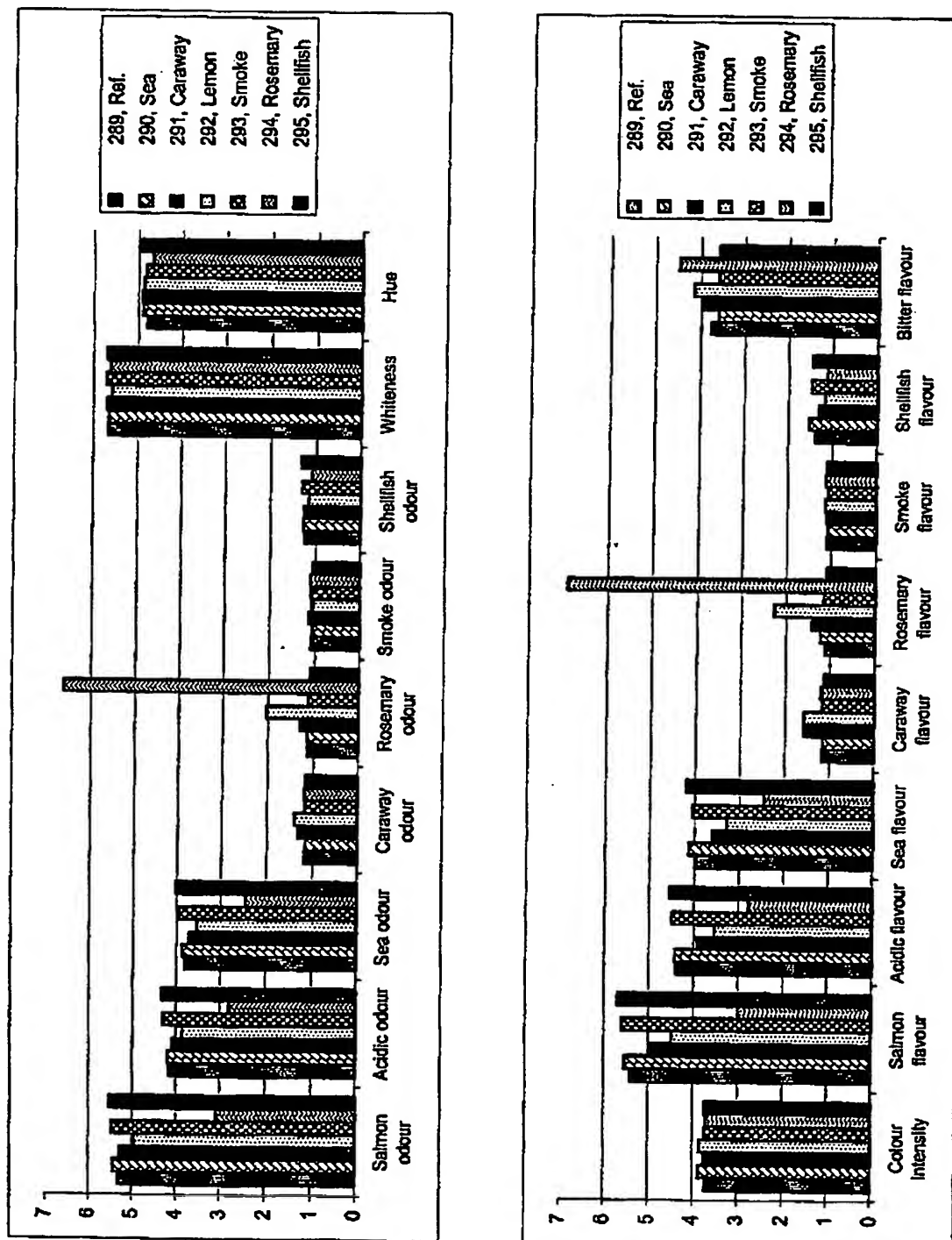
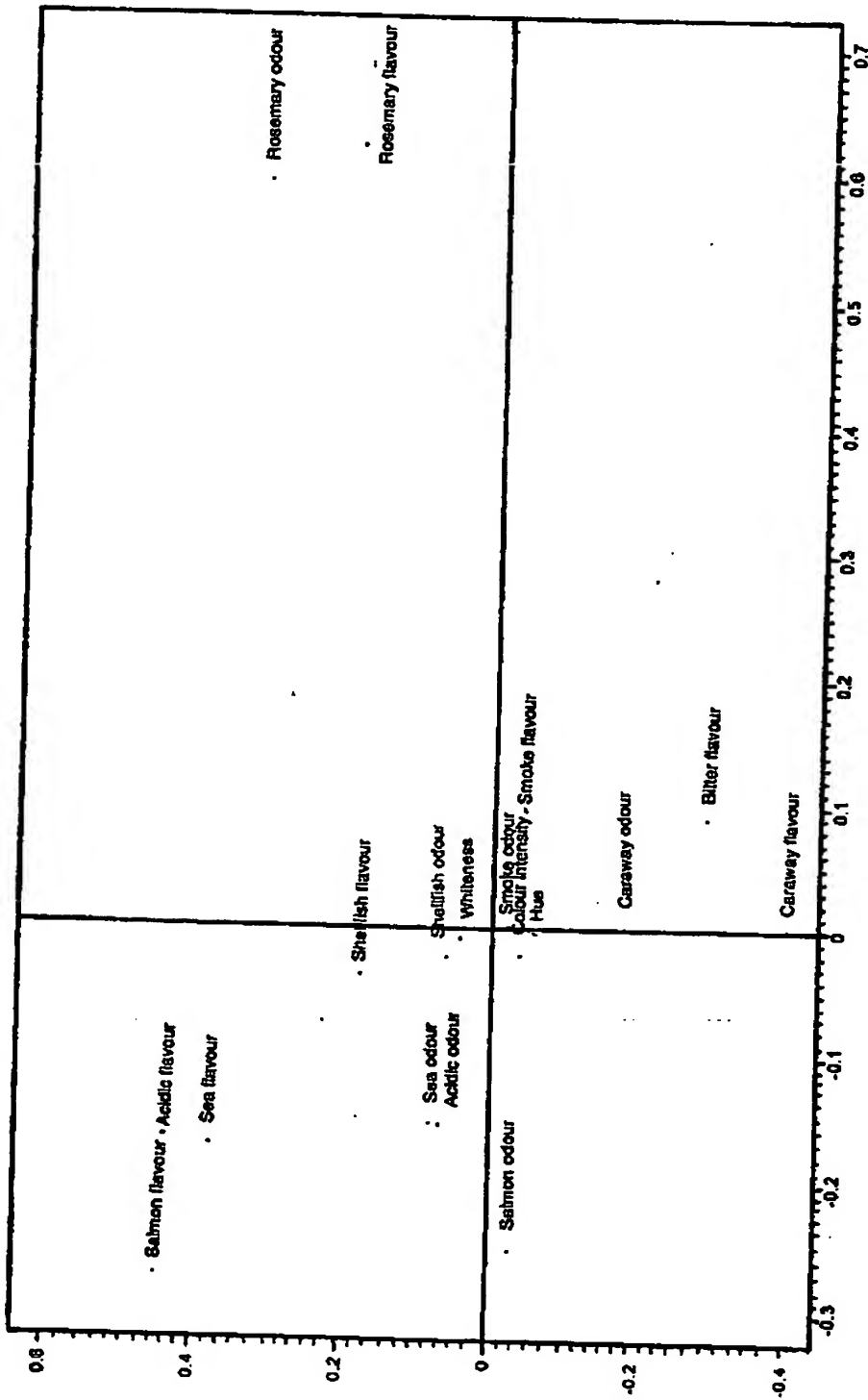
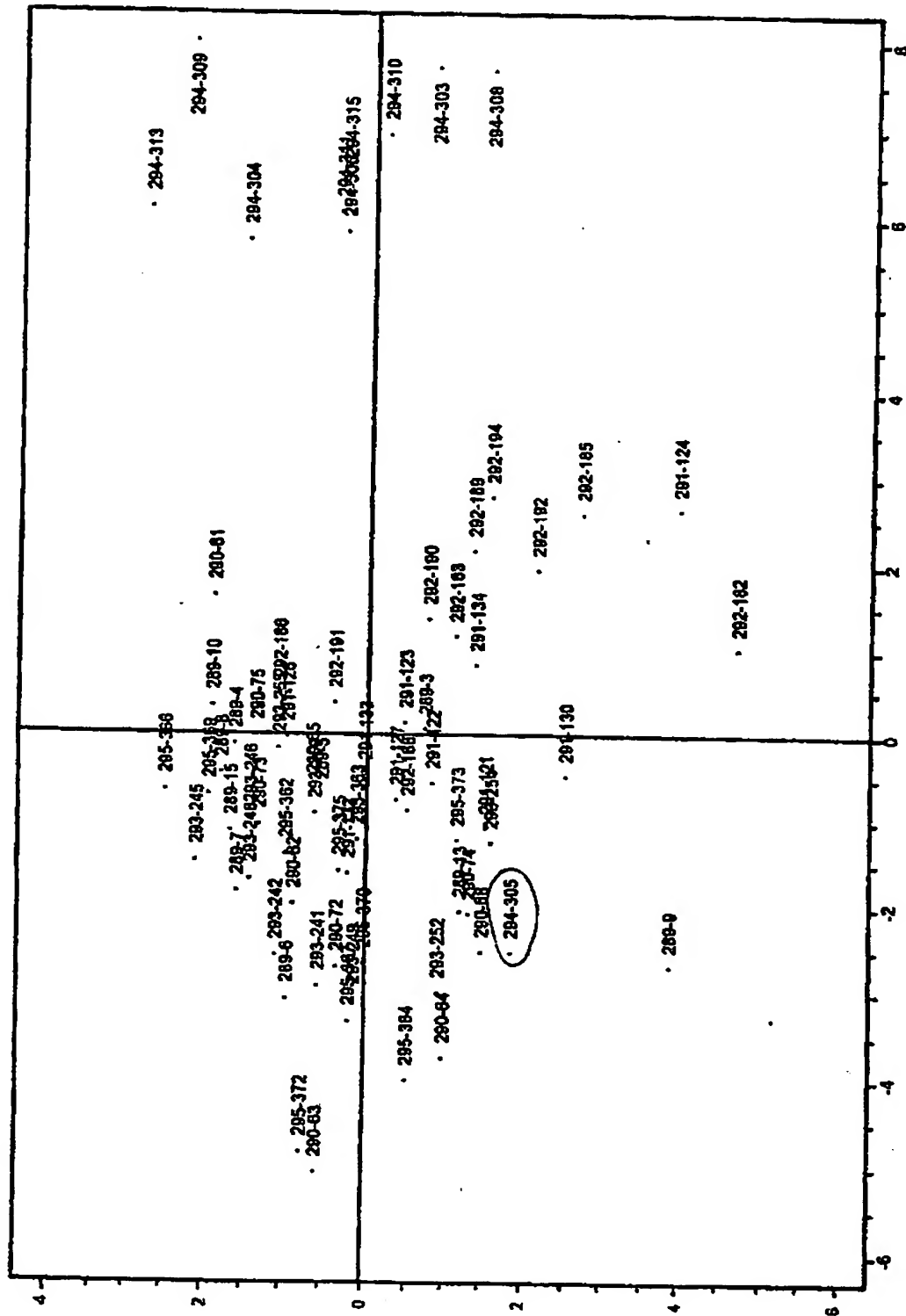


Figure 2: Scatter Plot showing Principal Component Analysis (PCA) on fish from Trial 1 fed 7 diets

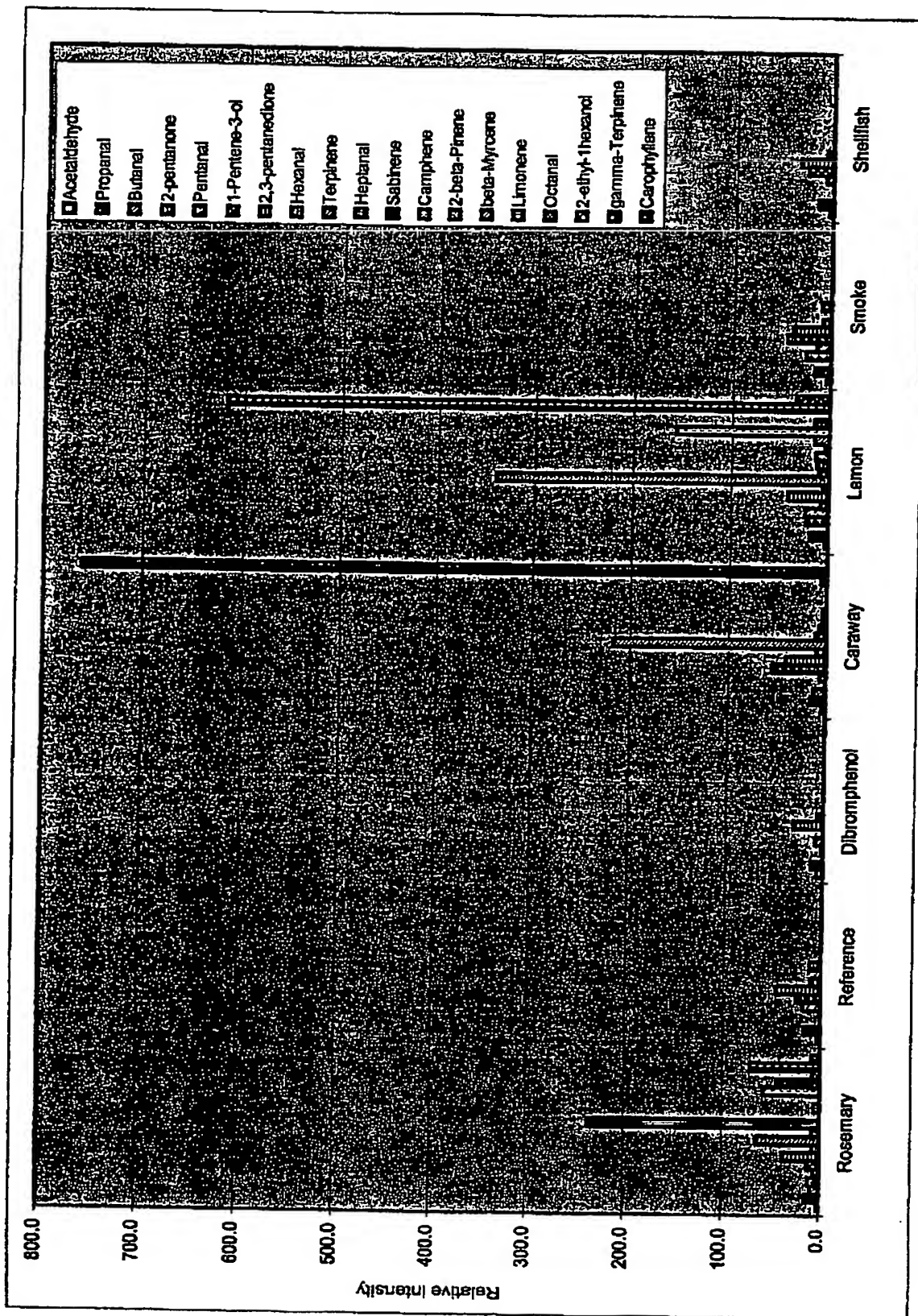


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Figure 3: Scatter Plot showing Principal Component Analysis (PCA) on individual fish samples



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Figure 4

Sample type	Salmon odour	Acidic odour	Sea odour	Caraway odour	Rosemary odour	Smoke odour	Shellfish odour	Whiteness	Hue
289, Ref.	5.30	4.17	3.81	1.18	1.14	1.09	1.25	5.66	4.80
290, Sea	5.43	4.19	3.88	1.16	1.14	1.06	1.28	5.65	4.90
291, Caraway	5.27	4.08	3.71	1.32	1.28	1.14	1.27	5.69	4.91
292, Lemon	4.95	3.86	3.55	1.40	2.04	1.06	1.16	5.58	4.88
293, Smoke	5.45	4.30	3.94	1.18	1.14	1.09	1.31	5.70	4.83
294, Rosemary	3.08	2.81	2.46	1.20	6.62	1.10	1.09	5.62	4.68
295, Shellfish	5.52	4.33	4.03	1.17	1.10	1.05	1.34	5.69	4.94

Sample type	Colour intensity	Salmon flavour	Acidic flavour	Sea flavour	Caraway flavour	Rosemary flavour	Smoke flavour	Shellfish flavour	Bitter flavour
289, Ref.	3.72	5.41	4.38	3.99	1.16	1.11	1.11	1.40	3.77
290, Sea	3.88	5.54	4.41	4.12	1.16	1.23	1.09	1.54	3.60
291, Caraway	3.76	4.96	3.93	3.61	1.60	1.42	1.12	1.31	3.94
292, Lemon	3.86	4.47	3.55	3.29	1.58	2.28	1.15	1.18	4.15
293, Smoke	3.73	5.61	4.48	4.04	1.18	1.15	1.08	1.49	3.60
294, Rosemary	3.71	2.99	2.79	2.47	1.21	6.90	1.13	1.12	4.48
295, Shellfish	3.75	5.69	4.54	4.18	1.13	1.09	1.10	1.47	3.58

Table 1: Tukey's test results on fish fed the 7 diets detailed in Trial 1 for 12 attributes

Table 2

	Rosemary	Reference	Dibromophenol	Caraway	Lemon	Smoke	Shellfish
Acetaldehyde	2.3	3.3	5.8	3.8	2.5	3.6	3.6
Propanal	14.5	16.9	11.8	15.2	19.0	16.1	15.1
Butanal	8.9	0.0	0.0	11.9	0.0	0.0	0.0
2-pentanone	11.2	0.0	1.4	0.0	22.2	24.9	0.0
Pentanal	5.8	18.4	7.4	5.8	23.5	14.0	6.7
1-Pentene-3-ol	12.2	24.4	0.0	54.6	7.9	45.3	25.7
2,3-pentanedione	37.4	45.9	30.0	41.4	42.0	38.7	34.5
Hexanal	6.9	9.9	6.0	9.9	5.5	7.9	6.5
Terpinene	65.0	0.0	0.0	216.6	339.8	0.0	0.0
Heptanal	7.7	11.7	0.0	10.9	9.9	9.4	0.0
Sabinene	236.6	0.0	0.0	6.3	12.1	0.0	0.0
Camphene	0.0	0.0	0.0	2.9	13.0	0.0	0.0
2-beta-Pinene	6.0	0.0	0.0	4.2	3.7	0.0	0.0
beta-Myrcene	0.0	0.0	0.0	0.0	14.2	0.0	0.0
Limonene	58.2	0.0	0.0	0.0	157.0	0.0	0.0
Octanal	44.1	0.0	0.0	0.0	15.2	0.0	0.0
2-ethyl-1hexanol	7.2	0.0	0.0	5.3	0.0	0.0	0.0
gamma-Terpinene	71.3	0.0	0.0	761.2	617.8	0.0	0.0
Carophyllene	8.6	0.0	0.0	0.0	34.7	0.0	0.0

INTERNATIONAL SEARCH REPORT

Inter national Application No

PCT/GB 00/01207

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 A23K1/16 A23K1/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A23K A23L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, PAJ, EPO-Internal, FSTA, CAB Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE WPI Section Ch, Week 198517 Derwent Publications Ltd., London, GB; Class C03, AN 1985-103099 XP002142626 -& JP 60 049748 A (RIKEN KAGAKU KOGYO KK), 19 March 1985 (1985-03-19) abstract <div style="text-align: center;">— -/--</div>	1,2,4-6, 10,12,13

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
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- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
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Date of the actual completion of the international search

14 July 2000

Date of mailing of the international search report

26/07/2000

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/01207

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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X	<p>DATABASE WPI Section Ch, Week 199610 Derwent Publications Ltd., London, GB; Class D13, AN 1996-091576 XP002142627 -& JP 08 000185 A (HIRAMA S), 9 January 1996 (1996-01-09) abstract</p>	5,12
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International Application No.

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